DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
Interim Final 2/5/99
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)
Current Human Exposures Under Control

Facility Name: **Turbine Airfoil Designs, Inc.**
Facility Address: **1400 North Cameron Street Harrisburg, Pennsylvania 17110**
Facility EPA ID #: **PAD003010113**

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

   X If yes – check here and continue with #2 below.

   ☐ If no – re-evaluate existing data, or

   ☐ If data are not available skip to #6 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility [i.e., site-wide]).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	Yes	No	?	Rationale/Key Contaminants
Groundwater	X			TCE, vinyl chloride, benzo(a)pyrene, benzo(g,h,i)perylene, 2-methylnaphthalene, phenanthrene, pyrene above NR MSCs, and SPL detected.
Air (indoors)[2]		X		Evaluation concluded vapor intrusion pathway not a concern.
Surface Soil (e.g., <2 ft)	X			VOCs and SVOCs present in surface soil above soil-to-groundwater NR MSCs. None above direct contact MSCs.
Surface Water		X		Discharges to Paxton Creek contained. No samples collected. Groundwater fate and transport modeling – groundwater to surface water pathway incomplete.
Sediment		X		No samples collected. Groundwater fate and transport modeling – groundwater to surface water pathway incomplete.
Subsurf. Soil (e.g., >2 ft)	X			PCE, SVOCs and chromium present in subsurface soil above soil-to-groundwater NR MSCs. None above direct contact MSCs.
Air (outdoors)		X		Facility is no longer operating.

___ If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

X If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

___ If unknown (for any media) - skip to #6 and enter "IN" status code.

[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

[2] Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

Rationale and Reference(s):

The subject and surrounding properties were owned by Harrisburg Steel Corporation (HSC) between 1916 and 1943. HSC reportedly used the property as a slag disposal site in the 1920s and 1930s (AT Kearney [ATK], 1989). The facility was constructed in 1942 and manufacture of high pressure gas cylinders and demolition bombs, and shells without live charges began in 1943. The property on which the facility was located was ultimately sold to the Commonwealth of Pennsylvania in 1949, and has been used for the manufacture of jet airplane parts since that time. The facility has been operated by various leased entities, specifically TRW, Inc. [TRW], Chromalloy American Corporation (Chromalloy), and Turbine Airfoil Designs, Inc. (TAD). Note that TRW operated on both the subject property (18.62 acres) and the property currently owned by Dayton Parts, Inc. (Dayton) (formerly Stanley Spring Works, located west of Paxton Creek and at the southwest corner of the intersection of Cameron and Calder Streets. However, TRW operated as two separate entities using separate USEPA ID numbers. TRW Turbine Airfoils Division (USEPA ID PA003010113, subject facility) operated on the subject property, while TRW Heavy Duty Parts Division (USEPA ID PAD101657179, now owned by Dayton Parts Harrisburg Truck Springs Manufacturing) operated on the property currently owned by Dayton.

TRW, the original applicant of the Part A Hazardous Waste Permit submitted in 1980, conducted the following operations at the facility: (1) finish machining of both rotor and stator turbine blades to final size for sale as original equipment; (2) bonding a metallic or ceramic coating on some turbine blades to enhance oxidation and/or sulfidation resistance; and (3) providing a repair service for used rotor and stator blades for turbine users and operators.

During 1988, TRW manufactured blades and vanes for the aircraft industry according to the manufacturing process described in the Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) (ATK, 1989). The parts were manufactured from an alloy of nickel and cobalt. The machining process consisted of either the conventional methods (forging or casting, depending on the type of blade) or the electro-discharge machining (EDM) method. The conventional method required descaling using potassium hydroxide and degreasing using 1,1,1-trichloroethane (TCA), followed by sandblasting. Certain areas of the parts (such as the airfoil and gas path areas) were coated with aluminum silicon powder and heat-treated in a furnace to provide strength. The part was then etched with a solution of phosphoric, hydrochloric, or nitric acid to remove surficial impurities. Following the etching process, the part was provided with a hardened wearing surface by a plasma spray process before final inspection. The EDM method employed an electrode in a dielectric fluid (EDM oil) for a greater precision in shape than the conventional process, wherein the part took the shape of the electrode. After the part was shaped, the method of manufacturing for the final process was the same as the conventional process. The EDM oil was never disposed, but continuously recycled from a 5,000 gallon tank. The sludge accumulated on the filters (from recirculation of the oil from the tank) was collected in drums. Analytical data indicated that it was not ignitable, reactive or extraction procedure (EP) toxic (ATK, 1989). The EDM sludge reportedly was transported off-site for disposal.

In 2006, the Commonwealth of Pennsylvania sold the 18.62 acres on which the subject facility is located. The property was sold to NL Ventures via TAD who ultimately leased the property. TAD commenced manufacturing operations in 2002. The current property owner is NL Ventures. The facility was leased by TAD until January 10, 2010, when the facility was vacated. The facility is currently vacant and the majority of the equipment sold. Some wastes generated by TAD remain on-site and are currently being managed by NL Ventures under the Consent Order and Agreement (COA), dated July 11, 2008, to which TAD is also a party.

Solid Waste Management Units: In 1989, on behalf of USEPA, ATK conducted a RFA of the TRW facility to identify and evaluate past and potential releases to the environment from SWMUs and other AOCs present at the facility. ATK identified SWMUs and three AOCs during its evaluation of the TRW facility.

In 2007, Alliance Environmental Services, Inc. (AES) conducted an environmental investigation to determine baseline soil, groundwater, and soil vapor conditions at nine AOCs identified at the facility (see *Investigations*). During AES'

investigation, there was no evidence of active underground storage tanks (USTs) at the facility, and none were known to have been present since removal of 11 USTs from four general locations on the property in 1986/1987.

On February 3, 2010, an inspection was conducted by the Pennsylvania Department of Environmental Protection (PADEP) at the facility to evaluate and report on the current conditions of the SWMUs and AOCs identified in 1986 by ATK and those identified during review of regulatory files for the facility. The majority of the wastes observed by PADEP have been removed/disposed. Approximately 100 drums of non-hazardous waste and empty totes were removed from the facility. No hazardous wastes have been removed from the property. These wastes have been moved into the main manufacturing building awaiting sampling and analysis. Waste materials also remain in the treatment/holding vessels for the on-site wastewater treatment system and in the facility's central coolant systems.

Investigations: On March 17, 1986, TRW notified USEPA that an unknown quantity of oil from equipment and 55-gallon drums was discharged to Paxton Creek via the facility's outfalls during a fire that destroyed the facility on February 23, 1986. In addition, virgin chemicals including unknown quantities of nitric acid, sodium hydroxide, phosphoric acid, hydrochloric acid, ferric chloride, sulfuric acid, and hydrofluoric acid were released to the soils near northwestern end of the manufacturing building, and possibly to Paxton Creek. Adsorbent oil booms were placed in Paxton Creek to contain the release. The spill was reportedly diked with sand neutralized with soda ash (ATK, 1989). PADEP was informed of the release and responded immediately to provide guidance regarding mitigation and remediation.

On April 10, 1986, OBG (a consultant to TRW) informed PADEP of their intent to remove 11 USTs (Tanks 1 through 10 and 5A) at the facility, and the potential presence of contamination that was identified in soil samples from certain soil boring locations. The USTs ranged in capacity from 1,000 gallons to 78,000 gallons and were either empty, stored unleaded gasoline, or No. 2 fuel oil. Soil boring logs indicate that the depths of the soil borings ranged from 2.5 feet to 26.5 feet bgs. Fill materials (including brick, coal, slag, limestone cobbles, and concrete) were encountered to depths ranging from 12 to 26.5 feet bgs. Underlying native soils reportedly consisted of sand, silt, and gravel. In general, the borings were dry at completion; however, several of the logs indicate that the subsurface soils were wet below 12 feet bgs. Fuel oil was identified in two of the borings. Soil samples that were visually discolored or had a petroleum odor were composited and analyzed for oil and grease. The analytical results of the soil samples indicated that soil contamination was present around USTs 4, 5, 5A, and 6, and beneath UST 3 (Note: The analytical results were not located during the regulatory file review, nor were they discussed in reports related to the UST removals; therefore, specific concentrations are not discussed). A letter from OBG to PADEP dated April 25, 1986 stated that all USTs except USTs 3 and 4, and the 500-gallon UST located at the adjacent TRW Heavy Duty Parts Division facility were removed. A letter dated May 2, 1986 from OBG to TRW indicates that USTs 3 and 4 were ultimately removed by May 1, 1986. Contaminated soils were stockpiled, then disposed of off-site under a permit issued by PADEP. The steel USTs were cleaned and sold for scrap. The common wall shared by concrete USTs 1 through 4 (west wall) and the north wall of UST 1 remained in place due to the close proximity of existing structures. The concrete floor slabs of USTs 1 and 2 were crushed and left in place, while the floor slabs of USTs 3 and 4 were excavated and disposed of. No information related to confirmatory soil sampling for any of the removed USTs was found during the review of regulatory files.

The RFA of the TRW Turbine Airfoils Division facility was conducted by ATK in 1989 to identify and evaluate actual and potential releases to the environment from SWMUs and other identified AOCs. Seven SWMUs and four AOCs were identified at the facility. Details of the manufacturing process and wastes generated were presented in the RFA report, along with a list of wastewater permits, air emissions permits, and fuel oil/gasoline USTs. General descriptions of the environmental setting (e.g., geology, hydrogeology, surface water, and meteorology) and pollution migration pathways were also provided. Potential exposure pathways via soil, groundwater, and the surface waters of Paxton Creek were considered to be low. Potential receptors to contaminated soil were expected to be limited to facility employees; no groundwater wells were identified within a one mile radius of the facility; and Paxton Creek was not known to be used for recreational or drinking water purposes downstream of the facility. The report indicated there was no known potential exposure to subsurface gas resulting from activities conducted at the facility; however, exposure to airborne aluminum oxide particles and wastewater treatment sludge particles from the outdoor storage areas by facility employees and

residents within one mile of the facility was identified as a potential exposure pathway.

On January 26, 2006, LandAmerica Corporation (LAC), on behalf of NL Ventures, issued a Phase I Site Assessment Report for the facility. LAC identified several areas of recognized environmental conditions related to the former locations of USTs and ASTs, waste storage areas, stained areas observed during the Phase I evaluation, and the location of a pad-mounted electrical transformer that was in poor condition. LAC recommended further investigation be conducted in these areas.

In February 2006, LAC drilled 13 soil borings at the following locations (Appendix B - Figure 6: Soil Boring and Temporary Well Location Map):

- SB-1 Adjacent to former UST 7 (No. 2 fuel oil UST)
- SB-2 Northern outside wall of metal grinding sludge treatment area
- SB-3 Adjacent to former UST 5 (No. 2 fuel oil USTs 5/5A)
- SB-4 Adjacent to former UST 5 (No. 2 fuel oil USTs 5/5A)
- SB-5 Adjacent to former AST cradles
- SB-6 Adjacent to Conrail railroad tracks
- SB-7 Adjacent to existing hazardous waste storage area
- SB-8 Within former UST basin 1 (No. 2 fuel oil UST 1)
- SB-9 Within former UST basin 2 (No. 2 fuel oil UST 2)
- SB-10 Within former UST basin 3 (No. 2 fuel oil UST 3)
- SB-11 Within former UST basin 4 (No. 2 fuel oil UST 4)
- SB-12 Within former UST basins 8 through 10 (No. 2 fuel oil USTs 8, 9, and 10)
- SB-13 Within former UST basins 8 through 10 (No. 2 fuel oil USTs 8, 9, and 10)

Soil encountered at the facility consisted mainly of medium brown to black silty sand with gravel (slag) fill material. Wood fragments were encountered along the western portion of the property, corresponding with the previous locations of railroad spurs that were formerly present on the property. Foundry sands also were identified in several of the borings. Native material, consisting of silty to sandy clay, was encountered in some borings ranging from a depth of 12 to 16 feet bgs.

Nine of the soil samples (SB-1 through SB-7, SB-12, and SB-13) were submitted for analysis of volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). SB-7 also was analyzed for metals. Four of the samples (SB-8 through SB-11) were analyzed for SVOCs only.

Nine of the soil borings were converted to temporary groundwater monitoring wells (TW-1, TW-2, TW-3, TW-5, TW-6, TW-7, TW-9, TW-11, and TW-12). Groundwater samples were collected from all of the wells, except TW-9 and TW-12, which did not yield sufficient amounts of groundwater for sampling. The groundwater samples collected from TW-1 through TW-7 were analyzed for VOCs and SVOCs. Groundwater samples from TW-3, TW-5, and TW-7 also were analyzed for total metals (Note: only SB-7 soil was analyzed for metals. In addition, the report indicates that temporary well TW-3 was sampled for metals; however, the tabulated data and the discussion of the analytical results indicate that TW-2 was sampled for metals along with TW-5 and TW-7, not TW-3.) The TW-11 groundwater sample was analyzed for SVOCs only. The groundwater analytical results were compared to the PADEP Statewide Health Standards groundwater non residential (NR) medium specific concentrations (MSCs) for used aquifers containing less than 2,500 mg/L total dissolved solids (TDS). The results of groundwater samples collected from the temporary wells indicated that arsenic, barium, chromium, lead, and mercury were present in groundwater above the NR MSCs adjacent to fuel oil UST 7 (barium, lead, and mercury), outside the metal grinding sludge treatment area (chromium and lead), and adjacent to the existing hazardous waste storage area (arsenic, chromium, and lead). No VOCs were reportedly detected in the groundwater samples. SVOCs were not detected in any of the groundwater samples except TW-11, located within former UST 4 (fuel oil UST 4). Fluorene (520 µg/L) and phenanthrene (590 µg/L) were detected at concentrations below the NR

MSCs. A concentration of 1-methylnaphthalene (2,700 µg/L) also was detected; however, there was no PADEP MSC for this parameter at the time of the reporting. One SVOC was detected above the NR MSC, which was 2-methylnaphthalene at a concentration of 3,700 µg/L. Based on the data collected during the Phase II investigation, LAC concluded that releases of hazardous materials (solvents) and petroleum constituents had occurred at the facility. LAC further concluded that the elevated concentrations of metals in soil and groundwater may be attributed to the reported historical dumping of slag on the property. LAC recommended the following further actions at the facility: (1) notifying PADEP of the findings of the subsurface investigation; (2) conducting further delineation of contamination in the form of additional sampling and/or site characterization to be determined by PADEP; and (3) possibly entering the property into the Voluntary Cleanup Program (Act 2).

In March 2006, AES, conducted additional characterization activities for LAC to evaluate the technical and financial obligations that would be anticipated to move the facility through the Act 2 program and demonstrate attainment under the Special Industrial Area (SIA) standard. AES installed five groundwater monitoring wells to depths ranging from 20 to 30 feet bgs. The wells were installed in the following locations:

- MW-1 – East of former fuel oil USTs 8, 9, and 10
- MW-2 – South of former fuel oil UST 7
- MW-3 – Southeast of pad-mounted transformer
- MW-4 – Southeast of former fuel oil USTs 1, 2, 3, and 4
- MW-5 – Northeast of former fuel oil USTs 1, 2, 3, and 4

One round of groundwater samples was collected and the samples were analyzed for VOCs, SVOCs, and dissolved metals. VOCs detected in the groundwater samples included: n- and sec-butylbenzene, cis-1,2- dichloroethane (DCE), and trichloroethene (TCE). The detected concentrations were below the NR MSCs, except TCE, which was detected at a concentration of 5.14 µg/L in MW-3. SVOCs detected in the groundwater samples included acenaphthene, benzo(g,h,i)perylene, fluoranthene, fluorene, 1-methylnaphthalene, naphthalene, phenanthrene, and pyrene. The majority of the detected parameters were below the NR MSCs except benzo(g,h,i)perylene at MW-2 (0.42 µg/L), MW-3 (0.31 µg/L), and MW-5 (0.42 µg/L). Chromium was the only metal detected at dissolved concentrations in groundwater. Chromium was detected at MW-3 at 60 µg/L, below the NR MSC. Based on the data collected by LAC and AES, AES recommended that NL Ventures pursue the SIA standard, which involved preparation and submittal to PADEP of a work plan for a baseline remedial investigation, preparation of a Baseline Environmental Report (BER), submittal of a Notice of Intent to Remediate (NIR), and assistance with preparation of a COA. AES also recommended that NL Ventures conduct indoor air sampling, consider collecting a second round of groundwater samples, and prepare a final report to document the work performed under the COA.

On September 20, 2007, the BER was prepared by AES and submitted to PADEP. The BER described the investigation activities conducted at nine AOCs identified at the facility to determine baseline soil, ground water, and soil vapor conditions. All work was done in accordance with the BER Work Plan approved by PADEP in December 2006.

Based on a review of historical documentation, nine AOCs were investigated, which included the following:

Former USTs - Four fuel oil USTs (72,000 gallons; 74,000 gallons; 76,000 gallons; and 78,000 gallons) and one 1,000-
ɔn unleaded gasoline UST
- AOC 2: Former USTs - Two 20,000-gallon fuel oil USTs
- AOC 3: Former UST - One 1,000-gallon fuel oil UST
- AOC 4: Former USTs - Three 2,000-gallon fuel oil USTs• AOC 5: Former ASTs and Current AST - One 20,000-gallon fuel oil AST; one 5,000 gallon fuel oil AST; one 10,000-gallon waste oil AST; one 5,000-gallon TCE AST; and one 5,000-gallon waste oil AST (existing)
- AOC 6: Former ASTs - Two 5,000-gallon waste oil ASTs
- AOC 7: Transformers

- AOC 8: RCRA Waste Area
- AOC 9: Landfill – Fill material (slag) covering entire property

During additional investigation activities conducted in March 2006, AES installed five shallow groundwater monitoring wells (MW-1 through MW-5) downgradient of AOCs identified at the facility. During the baseline environmental investigation conducted in January through April 2007, AES installed three additional shallow groundwater wells (MW-6, MW-7, and MW-8). MW-6 was installed to further characterize groundwater in AOC 1. MW-7 was installed within AOC 5, northeast of AOC 2, to further characterize groundwater in the vicinity of these areas. MW-8 was installed downgradient of MW-6 to determine the extent of separate phase liquids (SPL) observed in MW-6. MW-6 and MW-7 were installed in January 2007, and MW-8 was installed in May 2007.

Groundwater samples were collected from the monitoring well network in January and April 2007. The samples were submitted for the analysis of VOCs, SVOCs, polychlorinated biphenyl (PCBs), and metals. No VOCs were detected at MW-1, MW-4, MW-7, or MW-8. TCE and vinyl chloride were detected in several wells at concentrations exceeding the NR MSCs, which were 5 µg/L and 2 µg/L, respectively. TCE was detected at MW-2 (15.3 µg/L), MW-3 (5.14 µg/L), and MW-5 (5.2 µg/L). Vinyl chloride was detected at 2.1 µg/L at MW-5. SVOCs detected in the monitoring wells above the NR MSCs included 2-methylnaphthalene (5,620 µg/L), phenanthrene (1,690 µg/L), and pyrene (157 µg/L) at MW-6; and benzo(a)pyrene (0.24 µg/L) and benzo(g,h,i)perylene (0.79 µg/L) at MW-8. Groundwater from MW-6 also contained detectable concentrations of dibenzofuran and 1-methylnaphthalene that do not have MSCs, nor do they have corresponding life time health advisory levels, which could otherwise serve as the MSC. One PCB, Arochlor 1254, was detected at 0.34 µg/L at MW-6 located near the former pad mounted transformer; however, this was the only PCB detected in any monitoring well on-site and the concentration was below the 1.4 µg/L NR MSC for this compound. Arsenic (MW-5), hexavalent chromium (MW-1 and MW-3), and zinc (MW-2) were detected during one or both sampling events above laboratory reporting limits, but below their respective NR MSCs.

In addition to the dissolved SVOCs, SPL was observed in MW-6 during the first sampling round. SPL was not observed during drilling/installation of the well. In April 2007, AES collected a sample of the SPL, which was identified by fingerprint analysis as diesel/No.2 fuel oil. AES initiated interim remedial action to recover the SPL from MW-6, removing approximately two gallons from the well using a bailer. The SPL was bailed until no appreciable thickness was observed. It was determined that the SPL was not associated with a recent release, and was likely to have occurred prior to the mid-1980s, related to a release from the concrete heating oil USTs (USTs 1, 2, 3, and 4) that were present in the area. AES concluded that the SPL did not pose an immediate, direct, or imminent threat because the liquid was at depth and was composed substantially of the low-solubility remnants, which were not mobile. Therefore, no further remedial measures were proposed for groundwater other than the filing of a deed restriction in accordance with 35 P.S. Section 6026.305. The language in the deed restriction would require that groundwater not be used for drinking or agricultural purposes at the site.

Based on the findings of the BER, TAD and NL Ventures obtained liability protection afforded under Act 2 for special industrial areas (SIA) for the constituents of concern (TCE, vinyl chloride, benzo(a)pyrene, benzo(g,h,i)perylene, 2-methylnaphthalene, phenanthrene, and pyrene) characterized at the property under the SIA standard. Note: that the BER indicated that the elevated concentrations of the SVOCs detected at MW-6 raised the reported detection limits of some compounds above the NR MSCs; therefore, additional SVOCs may be present at MW-6 above the NR MSCs, although the analytical data reported these compounds as not detected. PADEP comments to the BER (dated November 16, 2007) indicated that characterization for those specific compounds would be considered incomplete, and relief of liability would not be extended for those compounds. AES responded on December 5, 2007 that because the laboratory detection limits were met for all SVOCs analyzed in MW-8 (located approximately 30 feet east of MW-6, in the interpreted direction of groundwater flow), the MW-8 data is representative of AOC 1 and relief of liability should be granted for all SVOCs detected in AOC 1. Also note that a relief of liability was not requested for metals identified at the site because, according to AES, the presence of metals was likely related to the deposition of fill materials (slag and foundry sands) used to abandon the former canal, rather than to former industrial operations conducted on-site.

AES conducted fate and transport modeling using SWLOAD5B for compounds requiring further evaluation based on the criteria outlined in the PADEP Technical Guidance Manual (Land Recycling Program Technical Guidance Manual, Document Number 253-0300-100, dated June 8, 2002), from which it was concluded that no further modeling (PENTOX) was required, and the groundwater discharge to surface water pathway was incomplete. Therefore, assuming that groundwater flow discharging to Paxton Creek from all areas of concern was evaluated via the fate and transport model, it is concluded that no controls are relevant for the surface water/sediment exposure pathway. Note: There are no monitoring wells located in the vicinity of the former hazardous waste storage area located on the north end of the property; therefore, it is unknown whether groundwater is impacted in this area, and if so, if impacted groundwater is migrating beneath the adjacent PennDOT property and to Paxton Creek above regulatory standards.

According to the BER, the data collected during the soil vapor investigation indicated that the vapor intrusion pathway did not constitute a concern for the facility; therefore, AES considered the soil vapor pathway incomplete. Compounds identified in soil vapor did not exceed NR soil vapor screening values, and did not pose an immediate, direct, or imminent threat; therefore, no further remedial measures were proposed for soil vapor.

3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

	Potential **Human Receptors** (Under Current Conditions)						
Contaminated Media	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food[3]
Groundwater	No	No	No	No	No	No	No
~~Air (indoors)~~							
Soil (surface, e.g., <2 ft.	No	No	No	No	No	No	No
~~Surface Water~~							
~~Sediment~~							
Soil (subsurface e.g., >2 ft.	No	No	No	No	No	No	No
~~Air (outdoors)~~							

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated" as identified in #2 above.

2. enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("___"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

X If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

___ If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

___ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

Consent Order and Agreement (2008)

A COA was entered on July 11, 2008 between PADEP, TAD, and NL Ventures. The COA stated that NL Ventures and TAD did not cause or contribute to the contamination identified at the property, the parties intended to reuse the facility for non-residential industrial and commercial purposes, and that the property is not intended for residential use.

[3] Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.

Furthermore, the COA outlined the chain of title for the property and summarized the results of the September 2007 BER that was made part of the COA by reference. Furthermore, NL Ventures and TAD were not subject to remedial obligations, as long as the identified contamination did not prevent the occupation of the property for its intended purpose, since no immediate, direct, or imminent threats were identified.

The COA required that an Environmental Covenant be executed and recorded by NL Ventures and TAD that documents the occurrence of groundwater concentrations that exceed the NR MSC, the occurrence of SPL, prohibits the installation of on-site water supply wells, and requires the maintenance of the property's impervious cover.

Environmental Covenant (2008)

On November 5, 2008, the Environmental Covenant, executed pursuant to the Pennsylvania Uniform Environmental Covenants Act (UECA), Act No. 68 of 2007, 27 Pa. C.S. Sections 6501 – 6517, was recorded in the Dauphin County Courthouse. Certain key excerpts from the Environmental Covenant are as follows:

"The Property is subject to the following activity and use limitations, which the Owner/Holder and each subsequent Owner/Holder of the Property shall abide by: (1) the groundwater at and under the Property shall not be used for any drinking or agricultural purpose without treatment; (2) the Property shall be used solely for non-residential purposes; and (3) Grantee shall have a continuing duty to maintain the pavement caps/and or structures overlying the fuel oil SPL on the Property . . . and shall not allow any excavations of an approved cap without prior written notice and a plan submitted to the Department or successor with a schedule of implementation setting forth worker health and safety requirements, access limitations during excavations, and restoration of the cap or other alternatives that are approved by the Department in writing.

In order to maintain the liability relief of Act 2 for areas of the Land subject to a protective cover, where the cover is breached or removed, remaining soils or other materials where such excavation or removal occurs ("Area") shall either meet: (1) applicable statewide health standards or numeric based site specific standards approved by the Department in writing and all applicable federal, state and local laws, regulations and ordinances pertaining to the environment and occupational safety; or (2) be covered with materials that eliminate the pathway of exposure to the underlying contamination and is capable of physically supporting the intended use of the Area. Such alternative cover shall be placed on the Area within such period of time as set forth in the worker health and occupational safety plan developed with respect to such Area as approved by the Department. The alternative cover shall thereafter be maintained by the Land owner in good and proper repair.

All excavated materials removed from the Land shall be managed, transported and disposed of in compliance with all applicable federal, state and local laws, regulations and ordinances including, without limitation, those pertaining to environmental protection and occupational safety."

The Environmental Covenant also requires a periodic compliance reporting requirement, as follows:

"By the end of every third January following the effective date of this Environmental Covenant, the Owner and each subsequent owner shall submit, to the Department and any Holder . . . , written documentation stating whether or not the activity and use limitations in this Environmental Covenant are being abided by. The Owner and each subsequent owner shall submit, to the Department and any Holder . . . , written documentation following transfer of the property, concerning proposed changes in use of the property, filing of applications for building permits for the property or proposals for any site work affecting the contamination on the property subject to this Environmental Covenant."

Department of Environmental Protection's Motion for Leave to Intervene (2009)

On March 25, 2009, PADEP conducted a hazardous and residual waste inspection at the facility. On May 15, 2009,

PADEP sent a letter to the facility regarding its findings and expressing concern regarding the quantity of residual and hazardous wastes remaining at the facility in light of the then state of slowing plant operations. The letter requested that the facility immediately address all existing violations related to lack of labeling and covers on residual waste containers and the lack of documented inspections. Furthermore, the letter requested that the facility provide a contingency plan documenting provisions and financial ability for disposal of all plant waste prior to final shutdown.

During PADEP's September 24, 2009 site visit, large quantities of wastes continued to be present, including leaking oily sludge containers. On September 24, 2009, following the discovery that TAD was potentially bankrupt, and was likely to not address its waste management responsibilities, PADEP filed a civil action motion in the United States (US) Middle District Court. PADEP requested the Court intervene and determine the liability for the wastes remaining at the facility. On October 9, 2009, following a conversation between PADEP and officers of TAD, the officers of TAD agreed to perform certain actions to address immediate environmental concerns, including: removal of a leaking roll off container and cleaning of the resultant spill; placing covers on all open drums; securing all entry doors to the facility; and repairing and maintaining the electric gate to control unauthorized access to the facility.

During a follow-up site visit conducted by PADEP on October 21, 2009, PADEP observed that the majority of the actions were not completed, although the gate was being repaired, which was believed to have been initiated by Textron (the lessor of the equipment remaining at the facility). In addition, Textron had retained the services of a former TAD electrician who assisted PADEP with securing the facility's entry doors. PADEP also observed additional chemical and waste storage areas located within the building and noted that oil was leaking from some of the machinery that should be immediately addressed.

A waste removal contractor, Waste Management of Pennsylvania, Inc. (WM), arrived on-site during PADEP's October 21st site visit to remove the outside roll off containers containing wastewater filtercake and spent grinding wheels. PADEP noted that WM dumped the waste on the ground prior to removing the containers from the site. PADEP contacted WM who hired an independent contractor to clean up the dumped materials. PADEP subsequently issued a consent assessment of civil penalty to WM on January 19, 2010.
As previously discussed, a site inspection was conducted at the facility in February 2010. The majority of the wastes (primarily non-hazardous wastes) observed by PADEP in 2009 were removed from the property. At that time, hazardous wastes remaining on-site had been moved inside of the main manufacturing building awaiting sampling and analysis. Waste materials also remained in the treatment/holding vessels related to the on-site wastewater treatment system and in the facility's two central coolant systems. The facility had been secured (all access doors to the facility appeared to be locked). The fence surrounding the facility was maintained and the front access gate was closed/locked with key only access.

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"**[4] (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

_____ If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

_____ If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

_____ If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

Rationale and Reference(s):

5. Can the "significant" **exposures** (identified in #4) be shown to be within **acceptable** limits?

_____ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

_____ If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

_____ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

Rationale and Reference(s):

[4] If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

__X__ YE – Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the Information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the **Turbine Airfoil Designs, Inc.** facility, EPA ID # **PAD003010113** , located at **1400 North Cameron Street Harrisburg, Pennsylvania 17110** under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

_____ NO - "Current Human Exposures" are NOT "Under Control."

_____ IN - More information is needed to make a determination.

Completed by
(signature) Kathleen Horvath Date 6-14-11
(print) Kathleen Horvath
(title) Sp Proj Chief

Supervisor
(signature) John F Krueger Date 6/14/11
(print) John F Krueger
(title) Environmental Program Manager
(EPA Region or State) PA DEP

Locations where References may be found:

USEPA Region III
Waste and Chemical Mgmt. Division
1650 Arch Street
Philadelphia, PA 19103

PADEP
South Central Regional Office
909 Elmerton Avenue
Harrisburg, PA 17110

Contact telephone and e-mail numbers
(signature) Linda Howell
(print) Linda Howell
(title) Facilities Supervisor

FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.

Facility Name:	Turbine Airfoil Designs, Inc.
EPA ID#	PAD003010113
City/State	Harrisburg, PA 17110

CURRENT HUMAN EXPOSURES UNDER CONTROL (CA725)